

*COLUMBINIA VASQUEZI*, A NEW CLAUSILIID  
LAND SNAIL FROM BOLIVIA

Fred G. Thompson

*Abstract.*—*Columbinia vasquezi*, new species, is described from Bolivia. It belongs to a species-complex that includes *C. bartletti* (Adams), *C. reyrei* (Jousseaume), *C. huancabambensis* (Rolle), *C. binkiae* (Pilsbry) and *C. juninensis* (M. Smith). The complex is distributed along the eastern slope of the Andes from Ecuador to Bolivia. The generic radiation of the South American Clausiliidae, Subfamily Neninae is characterized, in part, by reproductive specialization.

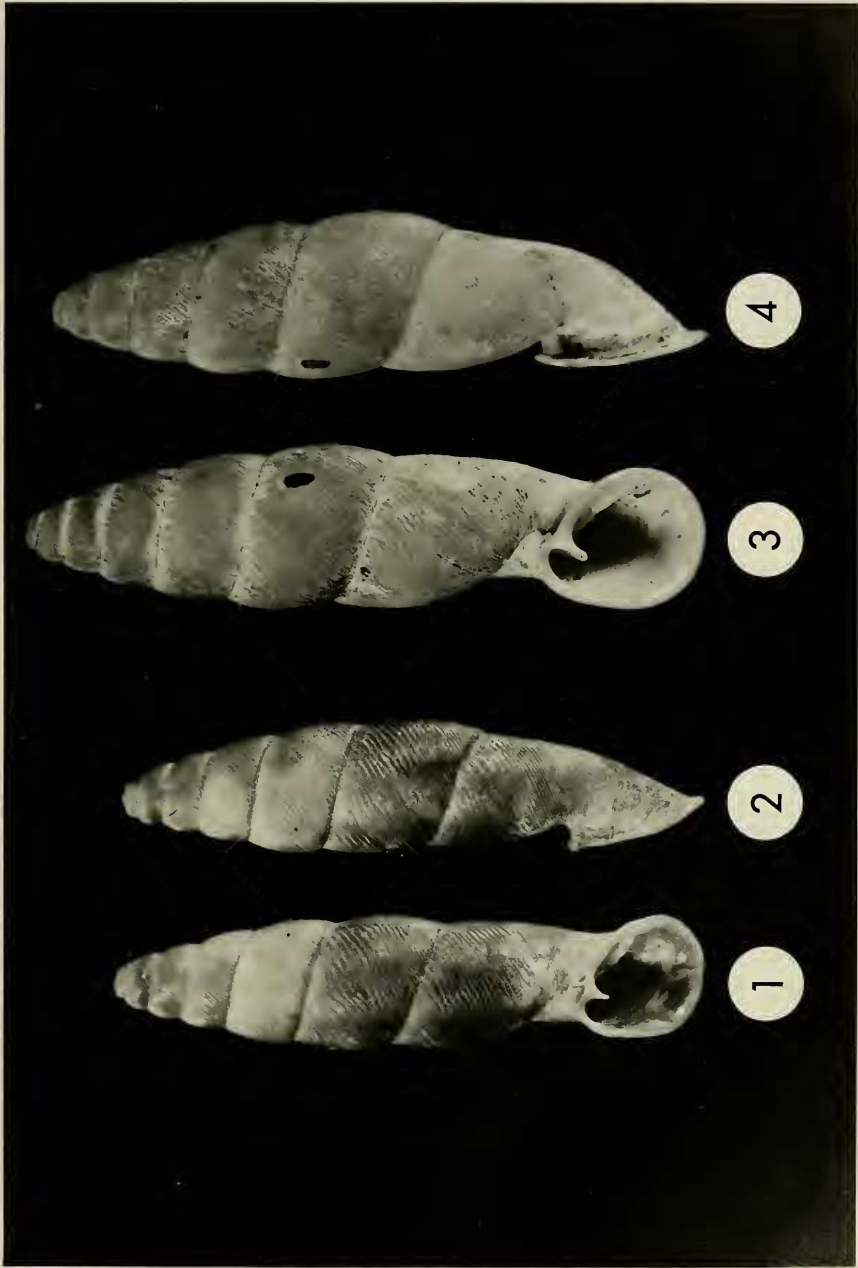
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Recently, while conducting field work in central Bolivia, I collected an undescribed species of clausiliid land snail in the lowland rainforests near Villa Tunari. I take great pleasure in naming this interesting species after Sr. Roberto Vasquez of Santa Cruz, Bolivia, a well known authority on Bolivian Orchidacea and Cactacea. Sr. Vasquez was highly instrumental in the success of my field work, and was a generous and courteous host.

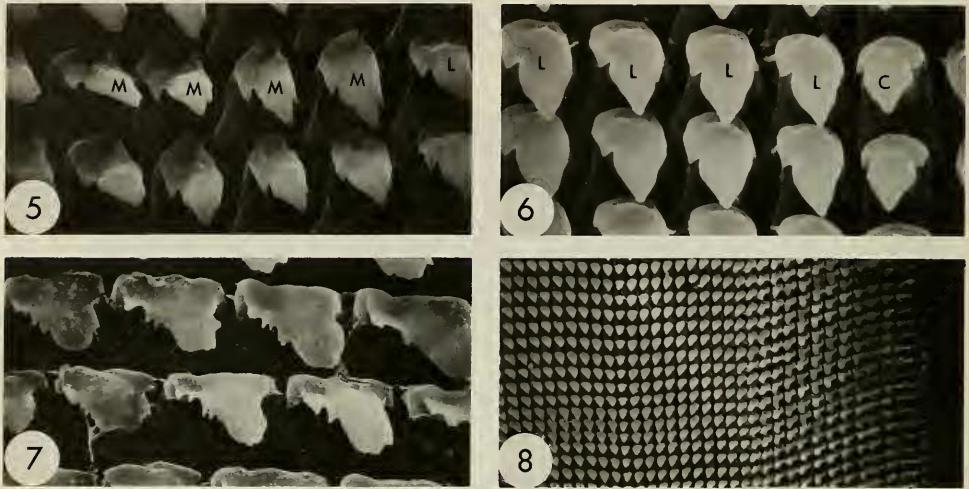
*Columbinia vasquezi*, new species

*Shell* (Figs. 1, 2).—Moderately obese; fusiform with bluntly pointed apex. Moderate sized for genus, about 23–28 mm long, and 0.24–0.26 times as wide as high. Surface shiny. Color light brown. Interior of aperture and lamella light brown. Peristome white. Whorls 7.2–7.9. Suture moderately impressed. Embryonic whorls 2.2. First whorl smooth; next embryonic whorl with fine arcuate striations. Following postembryonic whorls sculptured with fine oblique riblets tending to be slightly wavy and occasionally broken. Riblets diminishing in size near upper suture. Spaces between riblets densely sculptured with minute granules. Riblets closely spaced, about 3/mm on middle of shell. Penultimate whorl with 31–55 riblets (31 in holotype). Neck of last whorl broad and relatively short compared to most species in genus (Fig. 2); with elongate indentation externally between superior and inferior lamella.

Aperture ovate in shape, narrower than shell. Aperture 0.79–0.84 times as high as wide; 0.25–0.28 times length of shell. Plane of aperture oblique; projecting forward 2–3 mm beyond periphery of shell (Fig. 2). Peristome moderately reflected. Superior lamella high, concave along its peripheral curvature; extending to edge of peristome; forming rather wide sinus with posterior corner of aperture. Superior lamella continued by slight flex with spiral lamella. Spiral lamella moderately high and thin; separated from principal plica by narrow gap about 0.5 mm wide. Inferior lamella thick and high internally, sloping to inner wall of outer lip. Subcolumellar lamella visible from aperture. Lunella strongly arched; highest near principal plica; diminishing as it approaches end of subcolumellar lamella, two barely in contact. Principal plica high and narrow, about one-half whorl in length; extending almost to peristome. Clausilium generalized in shape, spatulate, concave along outer surface; attached to columella one whorl below aperture.



Figs. 1-4. 1, 2, *Columbinia vasquezii* Thompson, new species, holotype (UF 40309); 3, 4, *Nenia juninensis* Smith [= *Columbinia juninensis* (Smith)]; holotype (UF 47868).



Figs. 5–8. *Columbinia vasquezii* Thompson, new species, radula (UF 40322, SEM mount): 5, Marginal teeth (M),  $\times 735$ ; 6, Central teeth (C) and lateral teeth (L),  $\times 735$ ; 7, Outer marginal teeth,  $\times 735$ ; 8, Hemisection of radula showing weakly arched transverse tooth rows,  $\times 106$ .

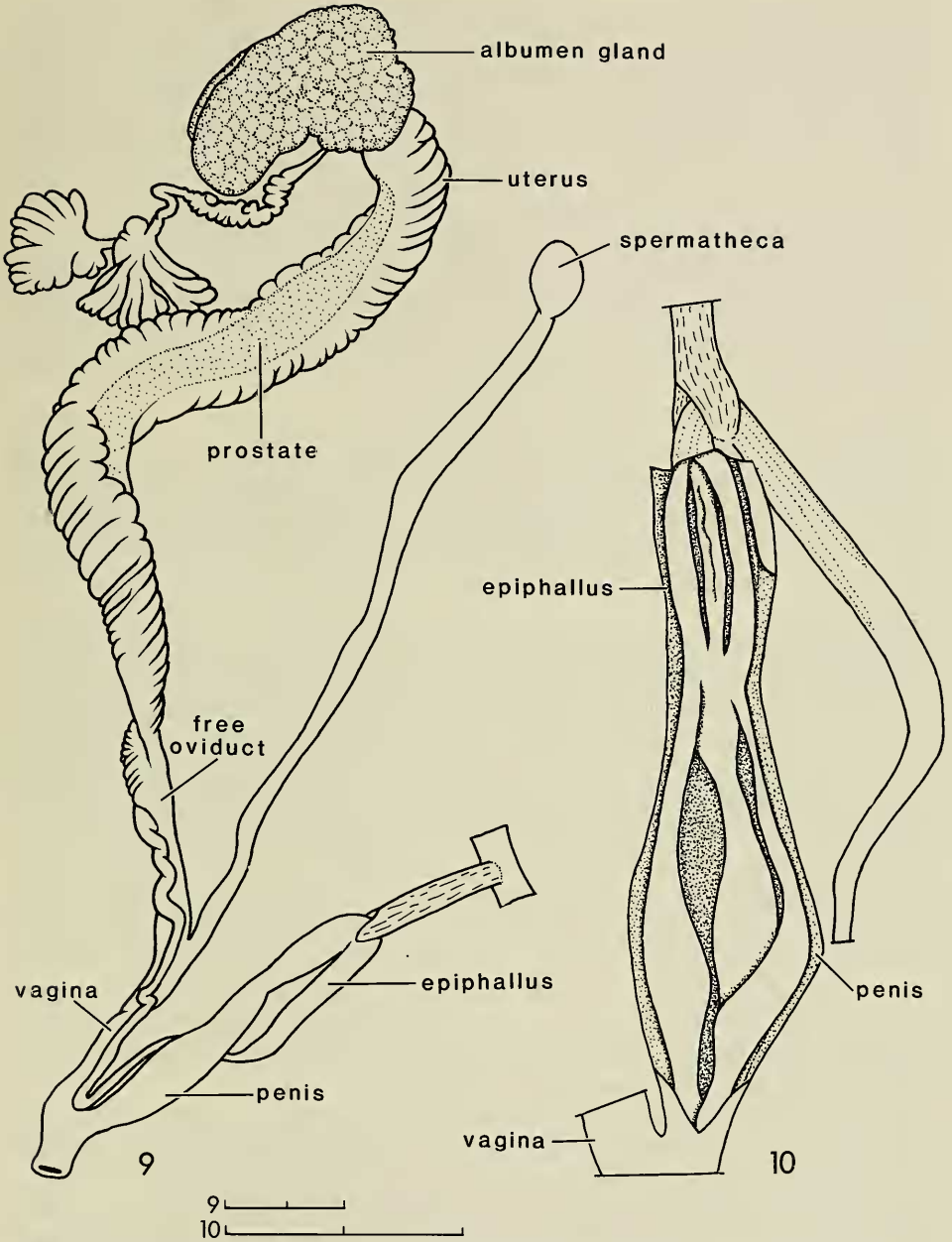
Measurements in mm for *C. vasquezii* and the holotype of the closely related *C. juninensis* (M. Smith) (UF47868) are given below.

<i>C. vasquezii</i>	length	width	apert. h.	apert. w.	whorls
holotype	27.3	6.6	6.9	5.3	7.9
paratype	23.7	6.2	6.3	5.0	7.2
paratype	24.9	6.4	6.9	5.8	7.2
<i>C. juninensis</i>	30.4	7.7	7.8	6.2	7.8

*Radula* (Figs. 5–8).—One specimen examined. Ribbon 2.36 mm long by 0.74 mm wide. Teeth arranged in 144 weakly arched transverse rows (Fig. 8). Central tooth (Fig. 6C) tricuspid with large broadly pointed mesocone and small ectocone on each side near base. Lateral teeth (Fig. 6L) 10 per half row; bicuspid with large mesocone similar to central tooth, and with single small ectocone. Marginal teeth (Fig. 5M) 16 per half row; essentially tricuspid, but cusps weakly differentiated except for mesocone; accessory cusps and indentations may be present on outermost teeth (Fig. 7).

*Reproductive system* (Figs. 9, 10).—The following description is based on a single specimen (UF 40322) from the type locality. Fragments of its shell are catalogued with the paratypes (UF 40598).

Left ocular retractor muscle passing through atrium of reproductive system. Ototestis a large compact mass imbedded in digestive gland 3 whorls above albumen gland; consisting of multiple bifurcate and trifurcate alveoli. Hermaphroditic duct strongly convoluted along lower half near albumen gland. Talon and carrefour completely imbedded in albumen gland. Albumen gland relatively large, massive, 4.7 mm long. Uterus with strongly differentiated convolutions. Spermathecal sac oval, 1.1 mm long, lying along columellar side of prostate just below albumen gland. Spermathecal duct slender, 13.5 mm long, without diverticulum; entering vagina about  $\frac{2}{5}$  of distance below. Free oviduct 2.3 mm long. Vagina 2.9



Figs. 9, 10. *Columbinia vasquezi*, new species, reproductive system: 9, Entire reproductive anatomy; 10, Male system showing internal structure of penis and epiphallus. Scales = 2 mm.

mm long, slender. Appendix absent on free vagina or oviduct, such as occurs in *Hericina* and *Steeriana* (Loosjes and Loosjes-Van Bemmelen 1966). Lower  $\frac{2}{3}$  of penis bulbous, separated by slight constriction about  $\frac{1}{3}$  of distance from penis retractor to base. Upper  $\frac{1}{3}$  slender and nearly uniform in width. Penis tightly folded back along itself as epiphallic segment at insertion of penis retractor muscle.

Epiphallus above penis retractor cylindrical and rapidly tapering into vas deferens at top of bulbous penis base. Total length of penis 9.0 mm; epiphallic segment 3.2 mm. Interior of penis bulb with 3 large pilasters arranged slightly spiral to each other (Fig. 10). Upper  $\frac{1}{3}$  of penis above constriction with 4 similar but smaller pilasters continuing into middle of epiphallic segment. Remainder of epiphallic segment interior covered with small papillae. Penis retractor muscle short, originating on lower surface of lung; bifurcate where it inserts on penis. Penis sheath absent, such as occurs in *Nenia* (Thompson, in press).

*Type-locality.*—Bolivia, Departamento de Cochabamba, Providencia de Chapore, 15 km southwest of Villa Tunari, 440 m alt. The type-locality is at the base of a hill in a secondary rainforest. Snails were found on bushes in a dense thicket. HOLOTYPE: UF 40309, collected 10 Dec 1982 by Fred G. Thompson. PARATYPE: UF 40598, same data as the holotype.

*Remarks.*—*Columbinia vasquezi* is most similar to *C. juninensis* (M. Smith, 1943) (Figs. 3, 4). The latter differs from *C. vasquezi* by its larger size, its shallower suture, particularly along the upper whorls, its vertical aperture, and its sculpture. In *C. juninensis* the sculpture consists of fine, poorly differentiated wavy riblets that anastomose freely. Granular sculpture, such as occurs in *C. vasquezi* is absent, but the holotype of *C. juninensis* is worn, and the finer sculpture may have been obscured.

The original illustration of *C. juninensis* does not depict correctly the shell, and one would have difficulty identifying the species by referring to the original description. In most respects it is similar to *C. vasquezi* except as noted above. The holotype of *C. juninensis* (UF 47868) is illustrated for the purpose of comparing it with the new species. Smith (1943) mentions two specimens in addition to the holotype. One paratype (UF 49361) is in his collection, which was transferred recently from the University of Alabama to the Florida State Museum.

Weyrauch (1956:114–115) suggests that *C. bartletti* (Adams, 1866), *C. reyrei* (Jousseume, 1887), *C. huancabambensis* (Rolle, 1904), *C. binkiae* (Pilsbry, 1949), and *C. juninensis* (M. Smith, 1943) all may be related subspecifically because of similarities in shape. They come from widely scattered localities in Ecuador and Peru. I do not agree on the basis of published data that they are so overwhelmingly similar. All are known from only a few specimens, intergradation between any two of these taxa has not been demonstrated, and their differences are not clinal. *Columbinia vasquezi* is a member of this complex.

This is the first detailed description of the reproductive anatomy of species of *Columbinia* (s.s.). Too little is known about the anatomy of neotropical clausiliids to permit interspecific comparisons. Loosjes and Loosjes-van Bemmelen (1966:45) report on the anatomy of *C. bryantwalkeri* (Pilsbry). Their description is incomplete because of the state of preservation of their material. The information they provide is consistent with the following description of *C. vasquezi*, except that they do not give measurements for various structures. It is apparent that considerable diversity in the male and the female reproductive systems exists at the generic level, indicating that reproductive specialization has been a major factor underlying generic radiation within the subfamily Neniinae. *Columbinia* is a highly specialized genus that has undergone simplification of the female system through loss of the diverticulum from the spermathecal duct, along with elaboration of the male system through the development of enlarged and size-differ-

entiated pilasters within the penis and epiphallus. In more generalized genera, such as *Nenia* and *Nenisca* (Baker 1961; Loosjes and Loosjes-van Bemmelen 1966; Thompson, in press) the spermathecal duct bears a large diverticulum, the penis has a penis sheath, and the pilasters within the penis are nearly uniform in size and continue uninterrupted through the length of the epiphallus.

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